Objectives report samples

Environment, Water

Equipment

- Flow Demonstration Channel as shown in Figure 2
- Broad-crested weir
- Water
- Screw driver

Procedure

- Slope indicator was adjusted to the zero mark.
- All the dials were put off.
- The apparatus was plugged in and leveled
- Tailgate was made horizontal by adjusting knob near the control panel
- Dimensions of the rectangular notched weir on data sheet provided were measured and record
- The weir was placed in the channel, and attached with screws
- Small and large orifice knobs were opened slightly
- The pump was turned on
- Small orifice knob was closed
- Large orifice knob was slowly open to increase flow in the channel
- Using a ruler the height of the water upstream from the weir was measured and recorded
- Critical depth of the water above the weir were recorded
- Steps 11-13 were repeated for 10 trials

Calculations

- Calculate the theoretical discharge for each trial using Eqn. 5.

Using Excel and Eqn. 6, the following values of Cwd were obtained:

- Calculate the experimental discharge for each trial using Eqn. 1a.
- Calculate the yc for each trial using Eqn. 1a.

Graphs:

- Plot the following on separate graphs:
- Qtheo vs. measured yc
- y1 vs calculated yc
- Qexp vs. Qtheo
- Determine relationships between the variables, and show the equations.

The relationships of variables are as outlined below:

- Qtheo = 0. 0177Measured critical depth + 0. 0002
- Calculated Critical Depth = 3. 0531Measured critical depth - 0. 0334
- Qexp = 3. 6776Qtheo - 0. 0014
- Energy Grade Line Diagram for the first trial only

Discussion

In the calculations, the relationships between variables were established. The relationship between theoretical discharge rate and the measured critical depth is a positive correlation, such that an increase in measured critical depth would result in proportional theoretical rate of discharge according to the equation; Qtheo= 0. 0177Measured critical depth+0. 0002 . On the other hand, the calculated critical depth is greater than the measured one such that the relationship is as per the equation,

y1= 3. 053yc-0. 0334

The third relationship determined from the calculation is the one between theoretical and experimental discharge. The two correlate in the equation; Qexp= 3. 6776Qtheo-0. 0014 such that the theoretical value was lower than the experimental discharge value. The results obtained from these calculations point out that there is a distinct disparity in discharge over a broad-crested weir by using the height of the upstream flow versus the critical depth over the weir. In similar circumstances, there seemed to have been more discharge in the height of upstream flow method as compared to use of critical depth over a weir. However, it was expected that the two would be similar because they are subjected to similar conditions and methodology. Thus, the determination of discharge through use of height of upstream flow method generates a higher value of discharge than the use of critical depth technique. This disparity is attributed to the possible systematic errors in the experiment set up which could include the accuracy in reading heights, critical depths, and stability of Flow Demonstration Channel.

Works Cited

Azimi, Amir Hossein, and N. Rajaratnam. " Discharge characteristics of weirs of finite crest
length." Journal of Hydraulic Engineering 135. 12 (2009): 1081-1085. Print.